Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 13(3): 2145, 17 June 2017 https://doi.org/10.15560/13.3.2145
ISSN 1809-127X

Range extension of brachyuran crabs of the family Camptandriidae Stimpson, 1858 (Crustacea: Decapoda: Brachyura) in Indian waters

Jigneshkumar N. Trivedi, Dhruva J. Trivedi & Kauresh D. Vachhrajani[1]

Marine Biodiversity and Ecology Laboratory, Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara-390002, Gujarat, India
[1] Corresponding author. E-mail: kauresh@gmail.com

Abstract. We report the presence of 3 species of brachyuran crabs, *Opusia indica* (Alcock, 1900), *Nasima dotilliformis* (Alcock, 1900) and *Leptochryseus kuwaitensis* (Jones & Clayton, 1983) (family Camptandriidae), for the first time from Indian waters. The species are so far reported from Iran, Iraq, Kuwait, UAE, Saudi Arabia and Pakistan. Records of these species in Indian waters extend their distribution range in the northern Indian Ocean.

Key words. Gujarat, India; Arabian Sea; new record.

Brachyuran crab species of the family Camptandriidae are common inhabitants of estuarine, mangrove-associated mudflat habitats and open mudflat habitats of the Indian Ocean and Western Pacific region (Jones & Clayton 1983). Approximately 40 species belonging to 22 genera are reported in the family Camptandriidae worldwide (Ng et al. 2008, De Grave et al. 2009, Ahyong 2014). Of these, only 2 species, *Camptandrium sexdentatum* Stimpson, 1858 and *Baruna socialis* Stebbing, 1904 are reported from Indian waters (Kemp 1915, Harminto & Ng 1991, Dev Roy & Das 2000, Dev Roy 2008, Dev Roy & Nandi 2008). The present study adds 3 more species, *Opusia indica* (Alcock, 1900), *Nasima dotilliformis* (Alcock, 1900) and *Leptochryseus kuwaitensis* (Jones & Clayton, 1983), to the list of Camptandriidae occurring in Indian waters.

This study was carried out as part of an ongoing study on the brachyuran crab fauna of Gujarat state, India. The specimens were collected from coastal areas of Lakhpat (23°50′01″ N, 068°46′26″ E) and Jakhau (23°13′26″ N, 068°37′37″ E) (Fig. 1) located on the coast of northern Arabian Sea in the Gulf of Kachchh, Gujarat, and consisting of mangrove mudflat habitats. Specimens were collected by hand during low tide. Specimens were washed properly to remove sediment and photographed in the field using a Canon 1000D with 18–55 mm lens. Specimens were preserved in 70% alcohol and deposited in the Zoology Museum of the Department of Zoology, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat, India. Specimen catalogue numbers are provided in the species accounts below. Maximum carapace width (CW) and length (CL) were measured for each specimen. The abbreviation G1 is used for male first left gonopod and coll. for specimen collector.

Family Camptandriidae Stimpson, 1858
Genus *Opusia* Ng, Rahayu & Naser, 2009

Opusia indica (Alcock, 1900) (Figs. 2, 3, 8–13)
Tylodiplax indica — Alcock (1900): 374; Alcock & Anderson (1895): pl. 64, fig. 2; Ng et al. (2008): 234.
Opusia indica — Ng et al. (2009): 6, fig. 1A, 2.

Material examined. 4 males and 2 females (ZL- AR-CR-82) (CL: 3.87–6.24; CW: 5.94–9.54); India, Gujarat, Gulf of Kachchh, Lakhpat (23°50′01″ N, 068°46′26″ E), open mudflat habitat, 27 March 2015, Coll. Jignesh Trivedi and Kauresh Vachhrajani.

Description. Carapace wider than long (Figs. 2, 8), dorsal surface with pits and folds with long plumose setae, 2 short transverse parallel grooves on either side of gastric region, anterolateral margin with row of granules extending halfway to posterior, ptergostomial region swollen beyond anterolateral margin; posterolateral margin strongly convex, rounded. Anterior straight with thick margin. Cornea small, eyestalk long, slender with plumose setae. Third maxilliped (Fig. 9)

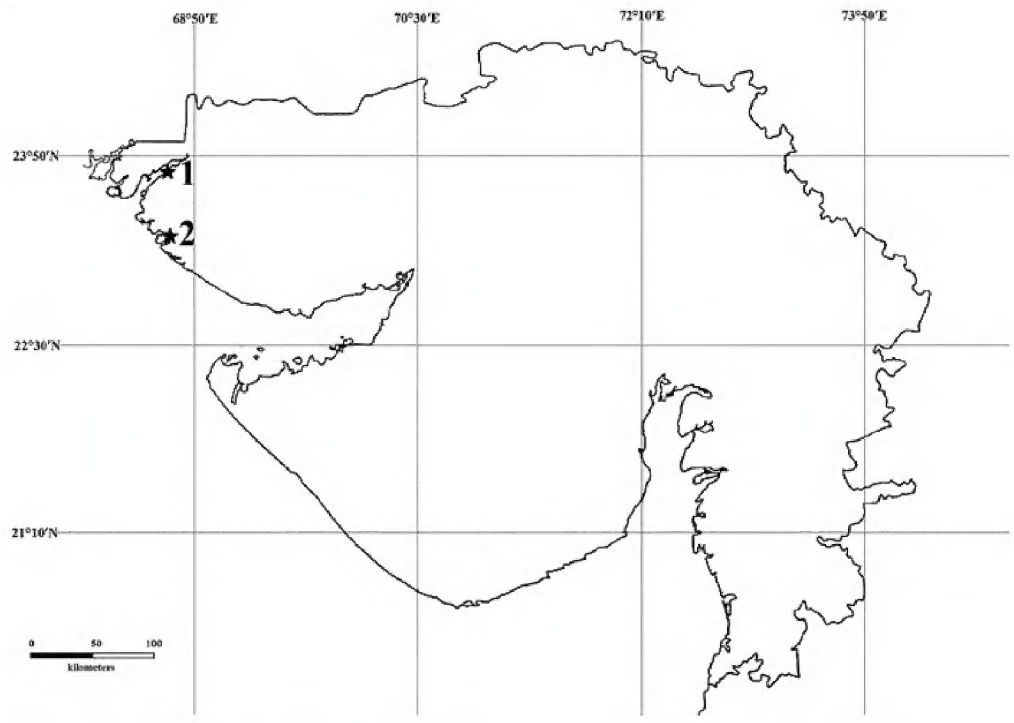


Figure 1. Map of specimen collection site. Gulf of Kachchh, Gujarat, India. 1: Lakhpat (23°50′04″ N, 068°46′10″ E). 2: Jakhau (23°13′26″ N, 068°37′37″ E).

Figures 2–7. *Opusia indica* (Alcock, 1900), male (CL: 3.87 mm, CW: 5.94 mm) (ZL- AR-CR-82), Gujarat, India. habitus, color fresh after collection: (**2**) dorsal view; (**3**) ventral view. *Nasima dotilliformis* (Alcock, 1900), male (CL: 7.52 mm, CW: 10.1 mm) (ZL- AR-CR-39), Gujarat, India. habitus, color fresh after collection; (**4**) dorsal view; (**5**) ventral view. *Leptochryseus kuwaitensis* (Jones & Clayton, 1983), male (CL: 19.79 mm, CW: 25.94 mm) (ZL- AR-CR-87), Gujarat, India. habitus, color fresh after collection: (**6**) dorsal view; (**7**) ventral view.

with ischium widening gradually distally, inner margin setose, merus about ½ of ischium length, outer distal angle expanded to form round lobe. Cheliped slender with long plumose setae on outer margin, chela (Fig. 10) palm with ridge parallel to lower margin on outer surface, row of short setae running parallel to lower margin on outer surface extending to immovable finger, fingers slender, about twice palm length, cutting edges sharp with row of setae running parallel to cutting edges. Ambulatory legs thick, flattened laterally, third ambulatory leg highly setose with granular merus; fifth ambulatory leg shortest. Male abdomen (Figs. 3, 11) with all the sutures between somites complete and clear, somite 1 slightly wider than somite 2, somites 3–5 immovable, somite 5 constricted near proximal end, telson about as long as broad with rounded apex. G1 (Fig. 12) recurved with distal part sharply bent, tip (Fig. 13) with row of small, thick spines, backward curving spines distal to apex, large mushroom-shaped spines subapically on inner side (Ng et al. 2009).

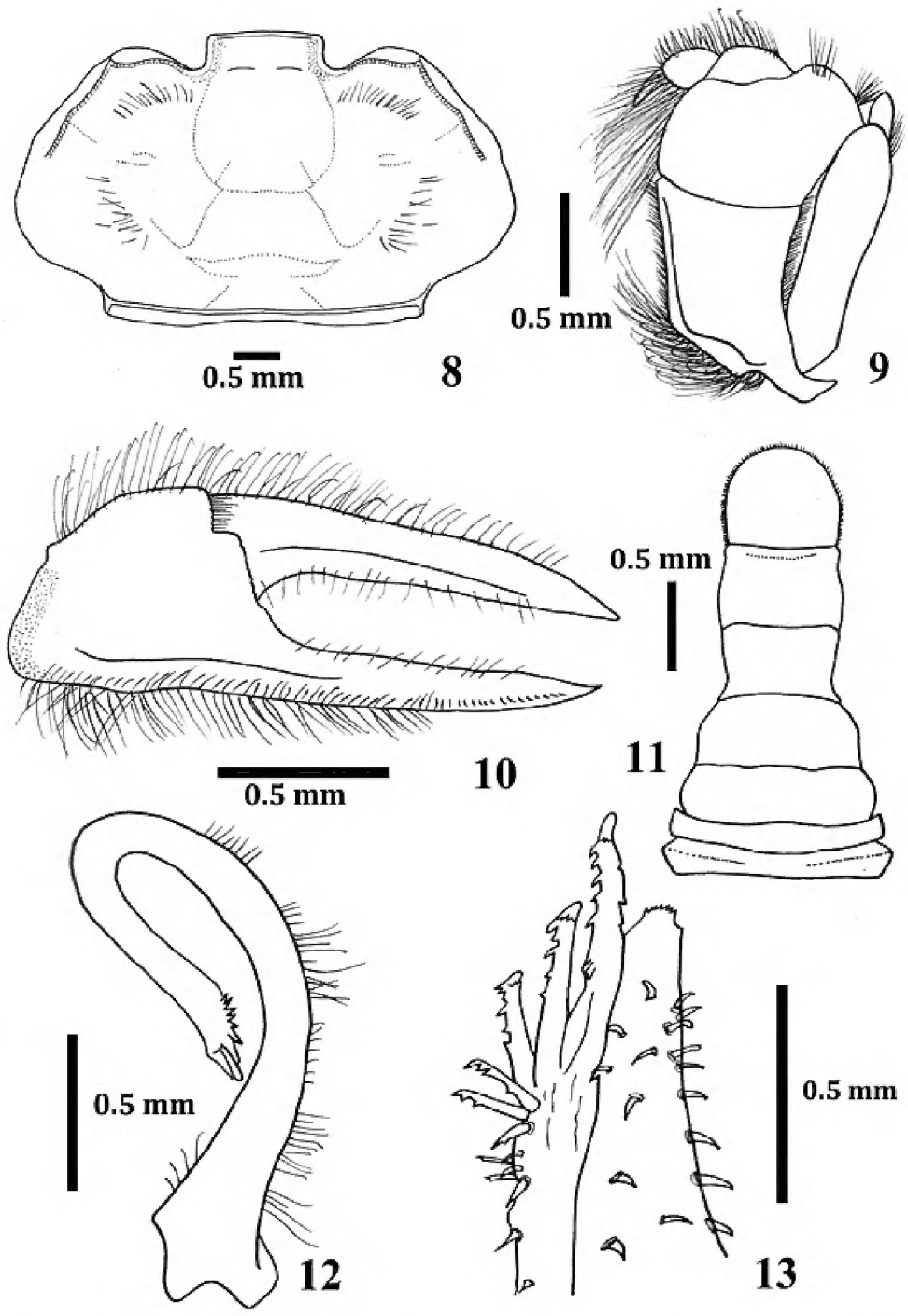
Habitat. The specimens were collected from small burrows in soft muddy substratum of the outer margin of a small channel located in the open mudflat habitat of Lakhpat.

Coloration in life. Carapace, cheliped and ambulatory legs cream with brown plumose setae; ventral body pale cream to white.

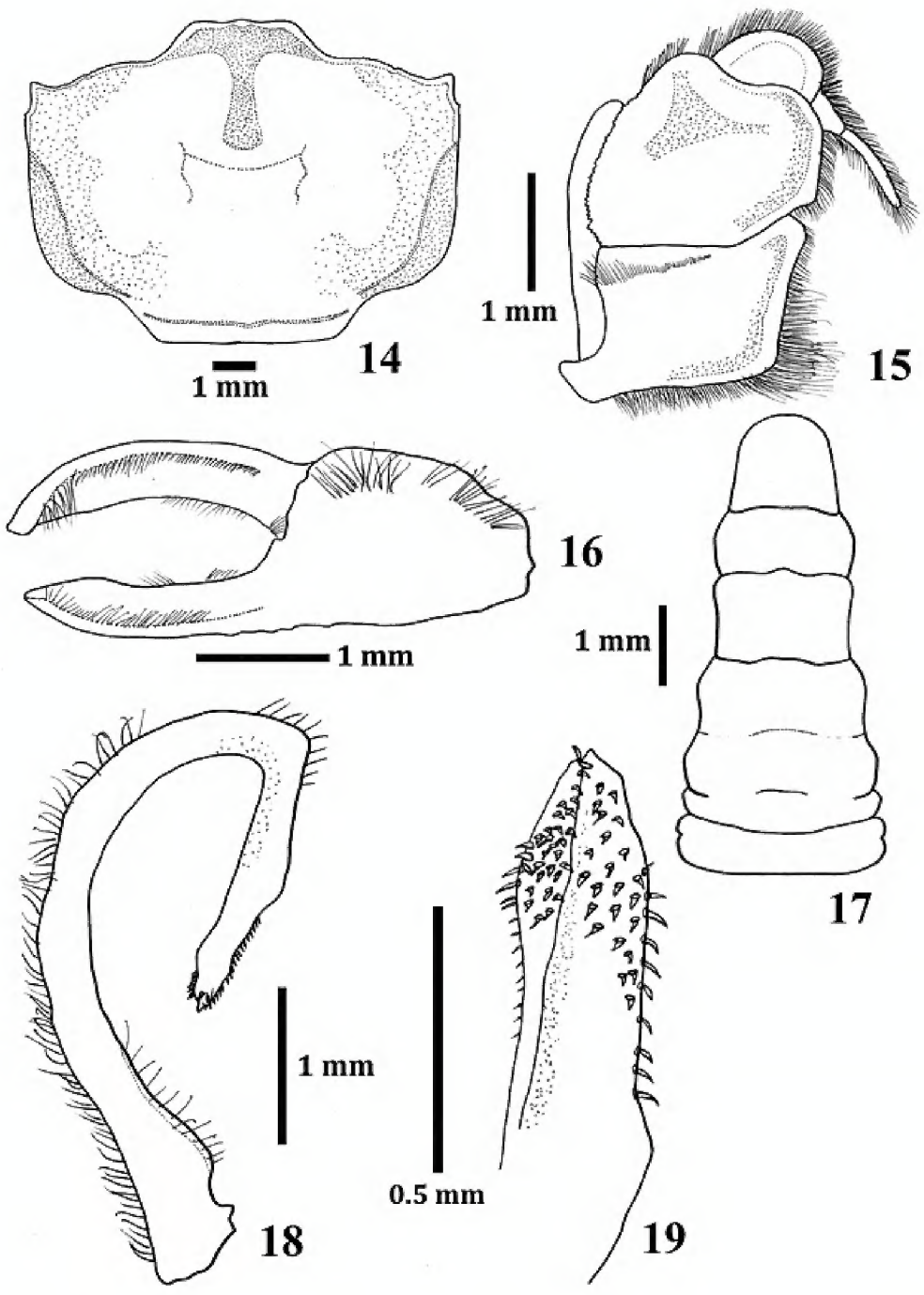
Distribution. The species is so far reported from the Persian Gulf (Naderloo et al. 2013); Iran (Stephensen 1946, Ng et al. 2009, Ghotbeddin et al. 2012, Naderloo et al. 2015), Iraq (Ng et al. 2009), UAE (Ismail & Ahmed 1993) and Pakistan (Alcock 1900, Ng et al. 2009) and now from the northern Arabian Sea in Gujarat state, India.

Genus *Nasima* Manning, 1991

Nasima dotilliformis (Alcock, 1900) (Figs. 4, 5, 14–19)



Figures 8–13. *Opusia indica* (Alcock, 1900), male (CL: 3.87 mm, CW: 5.94 mm) (ZL- AR-CR-82), Gujarat, India: (**8**) carapace; (**9**) third maxilliped; (**10**) chela outer view; (**11**) male abdomen; (**12**) entire G1; (**13**) apical lobe of G1.



Figures 14–19. *Nasima dotilliformis* (Alcock, 1900), male (CL: 7.52 mm, CW: 10.1 mm) (ZL- AR-CR-39), Gujarat, India: (**14**) carapace; (**15**) third maxilliped; (**16**) chela outer view; (**17**) male abdomen; (**18**) entire G1; (**19**) apical lobe of G1.

Clistostoma [sic] *dotilliforme* Alcock (1900): 373.

Paracleistostoma dotilliforme — Manning & Holthuis (1981): 201, 208.

Cleistostoma dotilliforme — Jones & Clayton (1983): 188, fig. 3.

Nasima dotilliformis — Manning 1991: 304, fig. 4; Al-Khayat & Jones (1996): 806, fig. 6; Ng et al. (2009): 11, figs. 5, 6, 10C.

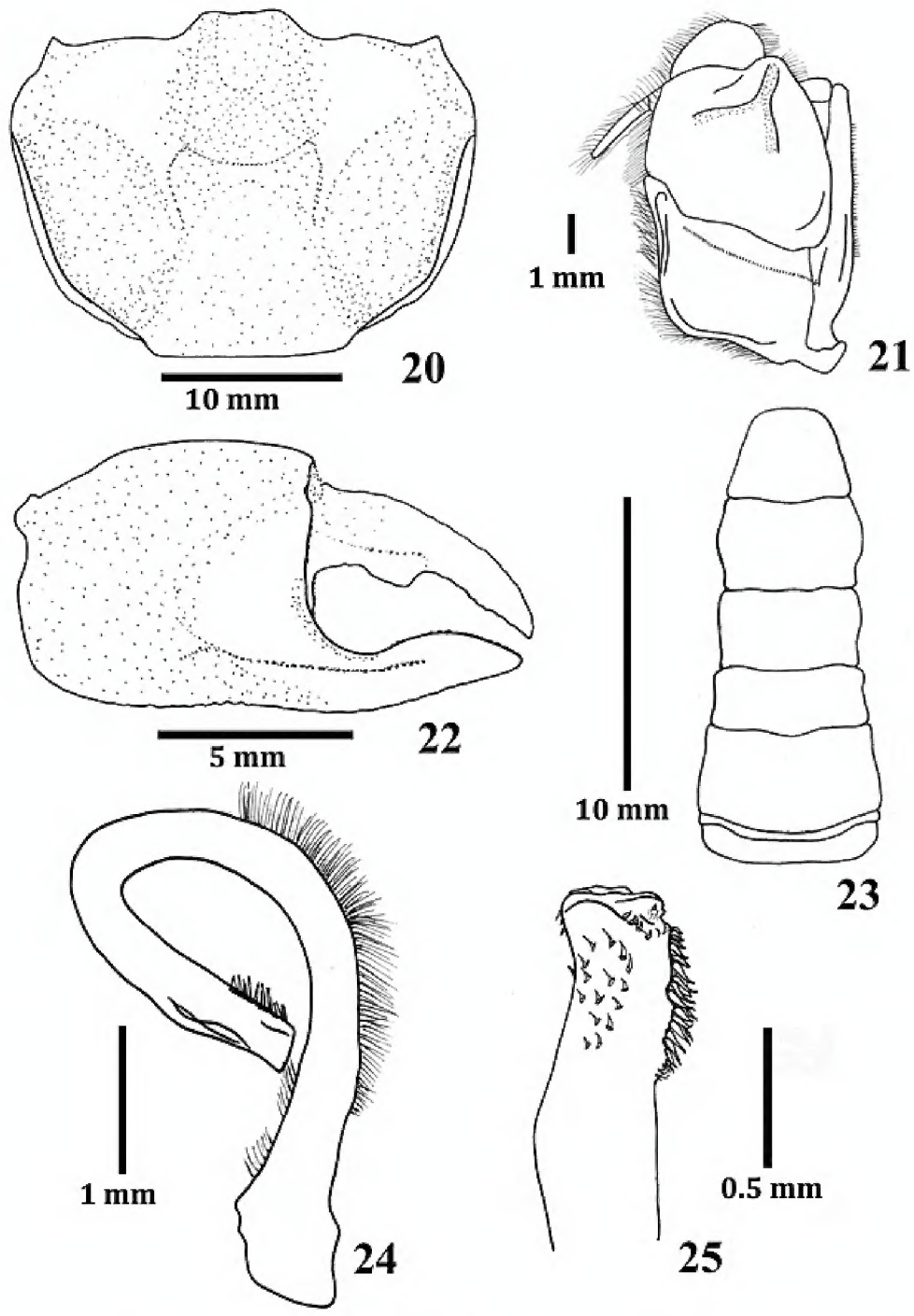
Material examined. 12 males and 3 females (ZL- AR-CR-39) (CL: 5.70–12.77; CW: 8.88–17.15). India, Gujarat, Gulf of Kachchh, Jakhau (23°13′26″ N, 068°37′37″ E), mangrove mudflat habitat, 7 July 2015, Coll. Jignesh Trivedi and Kauresh Vachhrajani.

Description. Carapace (Figs. 4, 14) wider than long; dorsal surface with well demarcated regions, 2 shallow depressions present behind external orbital tooth, slightly large granules forming a lobe posterior to external orbital tooth along anterolateral margin; posterolateral margin beaded; beaded ridge present parallel to posterior margin of carapace. Suborbital ridge with row of granules. Front deflexed. Third maxilliped (Figure 15) with Y-shaped groove on surface. Ptergostomial region with shallow Y-shaped groove. Chelipeds slender, not swollen or enlarged in both sexes as well as in large specimens; fingers (Fig. 16) of chela with dorsal and ventral row of long setae ending in spoon-shaped tips. Fingers without denticles on cutting edges. Ambulatory legs robust and broad, anterior margins granular with sharp distal edges, anterior margin of carpi and propodi with thick tomentum; fifth ambulatory leg shortest. Male abdominal (Figs. 5, 17) somite 1 slightly broader and wider than somite 2, somite 1 not reaching coxae of fourth ambulatory leg exposing part of sternite 8; somites 2–5 immobile, sutures between somites 2–4 not complete, slightly visible in median and lateral parts, telson longest with rounded apex. G1 (Fig. 18) recurved, sharply bent in distal third; subapical region (Fig. 19) of G1 moderately densely covered with backward curving, strong spines, apex conical with tapered tip (Ng et al. 2009).

Habitat. The specimens were collected from small burrows located in the upper intertidal zone of mangrove mudflat habitat located near Jakhau fishing harbor.

Coloration in life. Carapace light grey with cream patches. Cheliped outer margin cream with tinge of grey. Ambulatory legs cream with pale brown setae. Abdomen and thoracic sternite grey to pale cream.

Distribution. The species is so far reported from the Persian Gulf (Naderloo et al. 2013), UAE (Hornby 1997, Apel 2001, Ng et al. 2009), Kuwait (Jones & Clayton 1983; Ng et al. 2009), Bahrain (Ng et al. 2009), Iran (Naderloo et al. 2015), Iraq and Pakistan (Alcock 1900, Manning 1991, Ng et al. 2009), and now, from Gujarat, India.



Figures 20–25. *Leptochryseus kuwaitensis* (Jones & Clayton, 1983), male (CL: 19.79 mm, CW: 25.94 mm) (ZL- AR-CR-87), Gujarat, India: (**20**) carapace; (**21**) third maxilliped; (**22**) chela outer view; (**23**) male abdomen; (**24**) entire G1; (**25**) apical lobe of G1.

Genus *Leptochryseus* Al-Khayat & Jones, 1996

Leptochryseus kuwaitensis (Jones & Clayton, 1983) (Figs. 6, 7, 20–25)

Cleistostoma kuwaitense Jones & Clayton (1983): 185, fig. 2.
Leptochryseus kuwaitense [sic] — Al-Khayat & (Jones) 1996: 798.
Leptochryseus kuwaitensis — Ng et al. (2009): 21, figs. 7, 8, 9B, 10B, 11G–L.

Material examined. 4 males and 1 female (ZL- AR-CR-87) (CL: 19.86–18.27; CW: 27.36–24.79), India, Gujarat, Gulf of Kachchh, Lakhpat (23°50′04″ N, 068°46′10″ E), open mudflat habitat, 27 March 2015, Coll. Jignesh Trivedi and Kauresh Vachhrajani.

Description. Carapace (Figs. 6, 20) wider than long; dorsal surface with scattered granules on branchial regions; shallow grooves running parallel to the lateral margin; dorsolateral margin distinct with row of large granules reaching above fifth ambulatory leg. Anterolateral margin with indistinct lobe formed by high granules immediately posterior to external orbital tooth; posterolateral margin rounded; posterior margin straight with district submarginal granular row. Front ⅓ of anterior carapace width; frontomedian region bilobed. Pterygostomial region finely granular, setose and with broad Y-shaped sulcus. Third maxilliped merus (Fig. 21) with strongly produced anterior distal angle; ischium roughly circular with prominent Y-shaped groove present on distal margin. Chelipeds globular, equal, longer and stouter; carpus inner margin with projecting rounded lobe covered with pointed granules; fingers (Fig. 22) with row of setae on inner margin terminating in rounded, slightly spatulate tips, movable finger with large, triangular tooth on cutting edge near proximal end; female chela similar to male but slightly elongated and more setose. Ambulatory legs elongated and robust; carpi and propodi with thick tomentum; second ambulatory leg longest, fifth ambulatory leg shortest; posterodorsal margin of meri of third and fourth walking legs with prominent sharp granules. Ventral margin with sharp spines; dactylus of third ambulatory leg with comb of hair in large males. Male abdomen broad (Figs. 7, 23), somite 1 subequal in width to somite 2, not reaching coxae of fourth ambulatory leg exposing part of sternite eight; somites 2–5 immobile, sutures incomplete to shallow, sutures between third and fourth visible as short, transverse, median groove; telson sub-semicircular. G1 (Figure 24) gradually recurved, tip (Fig. 25) broad, truncate, robust with numerous low subterminal spines on 1 side (Ng et al. 2009).

Habitat. The specimens were collected from large inclined burrows made in the soft muddy substratum of the outer margin of a small channel located in the open mudflat habitat of Lakhpat.

Coloration in life. Carapace bottle-green to olive with brown setae on lateral margins; chelipeds and ambulatory legs yellow with dark brown setae; ventral body yellow.

Distribution: The species is so far reported from Iran (Naderloo et al. 2015), Kuwait (Ng et. al. 2009), and now, from Gujarat, India.

The specimens of *Opusia indica* examined in this study agreed with the description and illustrations given by Alcock (1900) and Ng et al. (2009). Ng et al. (2009) revised the taxonomy of *Tylodiplax indica* (Alcock, 1900) and established the new genus *Opusia* Ng, Rahayu & Naser, 2009 for the species. *Opusia indica* (Alcock, 1900) differs from species of *Tylodiplax* in carapace shape and morphology of male G1 (Ng et al. 2009). The specimens of *Nasima dotilliformis* examined in this study agreed with the description and illustrations given by Alcock (1900), Jones & Clayton (1983), Manning (1991) and Ng et al. (2009). Alcock (1900) described *Cleistostoma dotilliforme* on the basis of single ovigerous female specimen collected from Karachi, Pakistan. Manning & Holthuis (1981) transferred *C. dotilliforme* to the genus *Paracleistostoma* De Man, 1895 on the basis of specimens collected from southern China. Later Manning (1991) revised the taxonomy of *C. dotilliforme* and placed the species in the new genus *Nasima* Manning, 1991. *Nasima dotilliformis* Manning, 1991 differs from other closely related genera in having similar chelipeds in both sexes and male abdomen having all 6 somites and telson free (Ng et al. 2009). The specimen of *Leptochryseus kuwaitensis* examined in this study agreed with the description and illustrations given by Jones & Clayton (1983), Al-Khayat & Jones (1996) and Ng et al. (2009). The specimen from Gujarat varies slightly in having complete and prominent sutures between male abdominal somites 2–5; these were incomplete to shallow in the male specimen examined by Ng et al. (2009).

ACKNOWLEDGEMENTS

The authors are thankful to the Ministry of Earth Sciences, Government of India, New Delhi for financial support under the research project entitled "Studies on Brachyuran Crabs of Saurashtra Coast" (Sanction No.: MoES/16/06/2013-RDEAS of 11-11-2014). The authors are thankful to Dr. Reza Naderloo of School of Biology, University of Tehran, Iran for valuable comments regarding the identification of the species, and to Miss Barkha Purohit for technical support. We also thank academic editor and anonyms reviewers for providing their valuable comments on the manuscript.

LITERATURE CITED

Alcock, A. 1900. Materials for a carcinological fauna of India. No. 6. The Brachyura Catometopa or Grapsoidea. Journal of Asiatic Society of Bengal 69: 279–486.

Alcock, A. & A.R.S. Anderson. 1895. Illustrations of the zoology of the Royal Indian Surveying steamer Investigator. Crustacea, part III, plates IX–XV. Calcutta: office of Superintendent of Government Printing. https://doi.org/10.5962/bhl.title.64230

Al-Khayat, J.A & D.A. Jones. 1996. Two new genera, *Manningis* and *Leptochryseus* (Decapoda: Camptandriinae), and descriptions of the first zoea of six brachyurans from the Arabian Gulf. Journal of Crustacean Biology 16: 797–813. https://doi.org/10.1163/193724096X00856

Apel, M. 2001. Taxonomie und Zoogeographie der Brachyura, Paguridea und Porcellanidae (Crustacea: Decapoda) des Persisch-Arabischen Golfes [Ph.D. thesis]. Frankfurt am Main: Johann Wolfgang Goethe-Universität. 268 pp.

De Grave, S., N.D. Pentcheff, S.T. Ahyong, T.Y. Chan, K.A. Crandall, P.C. Dworscha, D.L. Felder, R.M. Feldmann, C.H.J.M. Fransen, L.Y.D. Goulding, R. Lemaitre, M.E.Y. Low, J.W. Martin, P.K.L. Ng, C.E. Schweitzer, S.H. Tan, D. Tshudy & R. Wetzer. 2009. A classification of living and fossil genera of decapod crustaceans. Raffles Bulletin of Zoology 21: 1–109.

Dev Roy, M.K. 2008. An annotated checklist of mangrove and coral reef inhabiting Brachyuran crabs of India. Records of Zoological Survey of India 289: 1–212.

Dev Roy, M.K. & A.K. Das. 2000. Taxonomy, ecobiology and distribution pattern of the Brachyuran crabs of mangrove ecosystem in Andaman Islands. Records of Zoological Survey of India 185: 1–211.

Dev Roy, M.K. & N.C. Nandi. 2008. Brachyuran biodiversity of some selected brackish water lakes of India; pp. 496–499, in: M. Sengupta & R. Dalwani (eds.). Proceedings of Taal 2007: the 12th World Lake Conference.

Ghotbeddin, N., S.M.R. Fatemi & T. Valinasab.2012. Intertidal crabs of Chabahar Bay (northeast of Oman Sea): collections and biogeographic considerations. Iranian Journal of Fisheries Sciences 12: 440–451.

Harminto, S. & P.K.L. Ng. 1991. A revision of the camptandriine Genus *Baruna* Stebbing, 1904 (Crustacea: Brachyura: Decapoda: Ocypodidae), with descriptions of two new species from the Indo-West Pacific. Raffles Bulletin of Zoology 39: 187–207.

Hornby, R. 1997. A survey of the habitats, invertebrate fauna and environmental sensitivity of the mainland coast of the UAE, with information on status and distribution of Crustaceans. TRIBULUS: Emirates Natural History Group 7: 11–17.

Ismail, N.S. & M.A.E. Ahmed.1993. Macrobenthic invertebrates of mangrove, *Avicennia marina* (Forskål), and of intertidal flats of Khor Kalba, U.A.E., Gulf of Oman; pp. 155–161, in: H. Lieth & A.Al Masoom (eds.). Towards the rational use of high salinity tolerant plants. Vol. 1. Deliberations about high salinity tolerant plants and ecosystems. Dordrecht: Kluwer Academic Publishers.

Jones, D.A. & D. Clayton. 1983. The systematics and ecology of crabs belonging to the genera *Cleistostoma* de Haan and *Paracleistostoma* de Man on Kuwait mudflats. Crustaceana 45: 183–199. https://doi.org/10.1163/156854083X00613

Kemp, S. 1915. Crustacea Decapoda; pp. 199–325, in: Fauna of the Chilka Lake. No. 3. Memoirs of Indian Museum 5.

Manning, R.B. 1991. The status of *Cleistostoma dotilliforme* Alcock, 1900 (Crustacea: Decapoda: Ocypodidae), with the description of a new genus. Raffles Bulletin of Zoology 39: 299–306.

Manning, R.B. & L.B. Holthuis. 1981. West African brachyuran crabs (Crustacea: Decapoda). Washington, DC: Smithsonian Institution Press. 379 pp.

Naderloo, R., S. Ebrahimnezhad & A. Sari. 2015. Annotated checklist of the decapod crustaceans of the Gulf of Oman, northwestern Indian Ocean. Zootaxa 4028: 397–412. https://doi.org/10.11646/zootaxa.4028.3.5

Naderloo, R., M. Türkay & A. Sari. 2013. Intertidal habitats and decapod (Crustacea) diversity of Qeshm Island, a biodiversity hotspot within the Persian Gulf. Marine Biodiversity 43: 445–462. https://doi.org/10.1007/s12526-013-0174-3

Ng, P.K.L., D. Guinot and P.J.F. Davie. 2008. Systema brachyurorum: Part I. An annotated checklist of extant brachyuran crabs of the world. Raffles Bulletin of Zoology 17: 1–286.

Ng, P.K.L., D.L. Rahayu & M.D. Naser. 2009. The Camptandriidae of Iraq, with description of a new genus and notes on *Leptochryseus* Al-Khayat & Jones, 1996 (Crustacea: Decapoda: Brachyura). Zootaxa 2312: 1–26.

Stephensen, K. 1946. The Brachyura of the Iranian Gulf. With an appendix: the male pleopoda of the Brachyura; pp. 1–237, in: K. Jessen & R. Spärck (eds.). Danish Scientific Investigations in Iran 4.

Authors' contributions. JNT and KDV collected the specimens; JNT, DJT and KDV examined and identified the specimens; JNT, DJT and KDV prepared, reviewed and finalized the manuscript. All authors read and approved the manuscript.

Received: 12 February 2017
Accepted: 2 May 2017
Academic editor: Nasreen Peer